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Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W. - Room 222
Washington, D.C. 20554

March 17, 1994

Re: **Comments of Cylink Corporation to RM 8435**

Transmitted herewith are an original and nine copies of the comments of Cylink Corporation in the above referenced proceeding.

If you have any questions with regard to this matter, please contact me. I can be reached at 408-735-6690.

Sincerely,
CYLINK CORPORATION

By: _____
Steve Schear
Manager, New Business
Development

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Before the

**FEDERAL COMMUNICATIONS COMMISSION**

Washington, D.C. 20554



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| In the Matter of | ) | |
| | ) | |
| Amendment of Part 15 of the Rules | ) | |
| with regard to the operation of | ) | RM-8435 |
| spread spectrum transmitters | ) | |
| with directional antennas | ) | |

To: The Commission

**COMMENTS OF CYLINK CORPORATION TO PETITION OF WESTERN MULTIPLEX**

Cylink Corporation ("Cylink") respectfully submits the following comments to the rule making petition RM 8435 ("Petition") filed January 4, 1994 by Western Multiplex Corporation ("WMC") to amend the second sentence of Section 15.247(b) of the Commission's Rules pertaining to the use of directional antennas in conjunction with unlicensed spread spectrum transmitters operating under the Commission's Part 15 regulations.

Cylink is a pioneer in the commercial application of spread spectrum, and one of its founders, Dr. Jim Omura, is a nationally known authority on the technology. In 1986 Cylink started an R&D effort to develop commercial spread spectrum radio products conforming to the FCC Part 15 rules which allows unlicensed use of these radios for up to one watt output power. This effort resulted in a range of commercial radio products operating in all three ISM bands (i.e., 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz). Various Cylink spread spectrum radio models offer voice or data communications at data rates of up to 512 kbps full-duplex and installed operating ranges in excess of 30 miles. Several thousand such radios are in use in important commercial, educational and

industrial applications by Cylink's customers, providing wireless communications access where other solutions were neither economically or physically deployable.

In addition to the development of spread spectrum radios for its own markets, Cylink is actively involved in several joint ventures to develop cordless telephones, wireless PBXs, wireless local loops, broad band wireless metropolitan area networks, and wireless LANs for the ISM bands. Cylink is the first to have developed a single chip implementation of a spread spectrum baseband digital modem, designed for a cordless telephone.

## DISCUSSION

Since the amendment of the Part 15 rules under Docket No. 89-354 ("Docket"), on June 14, 1990, an unanticipated and significant new public requirement has developed for non-licensed outdoor communication systems operating in the ISM bands. The general outdoor environments for these significant new public applications encompass large populations of users within areas up to 30 miles in diameter. Satisfying these needs requires systems using high-gain directional antennas and transmitter output powers of up to one Watt. The public need for these important types of systems were unknown and therefore not considered by industry or the Commission in the proceedings under the Docket. The second sentence of Section 15.247(b) of the rules adopted in the Docket , due to go into effect June 22, 1994, are seriously in conflict with the continued development of this new public requirement and should be amended.

## DIRECTIONAL ANTENNAS

Prior to the availability of Cylink's spread spectrum radios, communication systems operating below 1 GHz tended to serve only narrowband applications. Cylink's AirLink 902-928 and 2400-2483.5 MHz broadband modems serve a wide variety of outdoor commercial point-to-point voice, point-to-point and point-to-multipoint data communication applications.

Broadband outdoor communication systems have typically used high-gain directional antennas in order to reduce interference from or with nearby radio transmission systems and to yield significantly higher geographic capacity per unit of bandwidth than can be obtained with non-directional antennas. To assure optimum path margins, it is virtually required to site outdoor high-gain directional antennas, operating in all three ISM bands, so as to provide an unobstructed radio path. Such antennas and siting significantly reduce the potential for interference with other ISM devices near the antennas or at any point in between. Such is not the case with lower gain, primarily omni-directional, antennas.

Cylink agrees with WMC that ISM band systems that use much more expensive, high-gain, directional antennas should not be penalized with an effective transmit power requirement lower than the transmit power allowed less spectrum efficient systems using omni-directional antennas. However, Cylink's believes such penalties should be removed from all three ISM bands, and not just the 2400-2483.5 MHz and 5725-5850 MHz bands as recommended by WMC in this petition.

## DEMONSTRATED PUBLIC NEED

Cylink is a manufacturer of point-to-point and point-to-multipoint spread spectrum radios operating in the frequency bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz under rule section 15.247 and the transition provisions of rule section 15.37. The transition provisions permit the use of antennas having directional gain in excess of 6 dBi without reducing the transmitter power below the allowed 1W maximum.

A widespread public need for these systems, in all the ISM bands, is clearly demonstrated by the Cylink's sales volume and use of these products throughout the United States. Users include educational institutions, public safety agencies, manufacturing and service companies, oil and gas pipeline companies, power utilities, railroads, common carriers, federal, state and local governments.

Cylink believes that the Petition, as amended by these comments removing restrictions from all three ISM bands, is in the public interest for the following reasons:

1. The public would benefit from continued availability of low-cost, non-licensed, products that can be swiftly installed in a wide variety of point-to-point and point-to-multipoint applications. Elimination of these products would needlessly subject the public to the significantly increased expenses of licensed equipment and the delay and frequency coordination expenses required with the use of licensed equipment; and

2. Industry will be able to respond to the needs of existing and emerging (e.g., broadband wireless metropolitan area networking) non-licensed, outdoor, communication systems with a wider variety of technology, products, and capabilities; and

3. The use of high-gain, directional, antennas will reduce the overall level of interference to other users of the ISM bands and promote spectrum re-use and better spectrum ecology practices; and

4. The requirement that the transmitter power for systems operating in all three ISM bands be reduced by an amount in dB that the directional gain of the antenna exceeds 6 dBi would damage the public interest by severely limiting the effective operation of systems manufactured for outdoor applications; and

5. After June 22, 1994, many members of the public who had been able to obtain equipment under the transition rules of section 15.37, will be forced to seek the use of alternative licensed equipment, with results counter to the intent of the Commission's actions to stimulate use of non-licensed spread spectrum systems. Thus, adding to congestion of the licensed spectrum; and

6. If the impediments of the second sentence of Part 15.247(b) are not removed, products that are clearly being used to meet a wide variety of public convenience and safety needs will be forced off the market or have significantly impaired utility; and

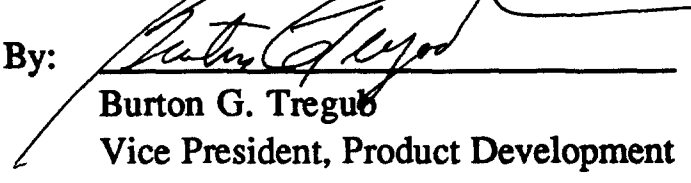
7. If the impediments of the second sentence of Part 15.247(b) are not removed, successful U.S. businesses will be greatly harmed.

## CONCLUSION

In summary, since the adoption of the Docket an unanticipated and significant new public requirement has developed, and been recognized and responded to, for non-licensed outdoor communication systems operating in all three the ISM bands. Servicing these outdoor environments and applications while promoting efficient use of spectrum require systems using directional antennas and transmitter output powers of up to one Watt. The implementation of rules adopted in the Docket will have a serious and unintended effect on the continued development of this new public requirement.

The Commission should solve these problems by removing the second sentence of Section 15.247(b) of the Commission's Rules and continue the availability of highly popular outdoor, non-licensed, communication systems, in all three ISM bands, now operating under the transition provisions of rule 15.37 using high-gain directional antennas.

Respectfully submitted,
CYLINK CORPORATION

By: 

Burton G. Tregub
Vice President, Product Development

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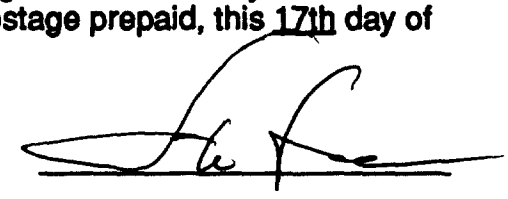
(408) 735-5800

March 16, 1994

## CERTIFICATE OF SERVICE

I, Steve Schear hereby certify that a copy of the foregoing Comments of Cylink Corporation was mailed first-class United States mail, postage prepaid, this 17th day of March 1994 to the parties listed in the service list below.



John Woods
President
Western Multiplex Corporation
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